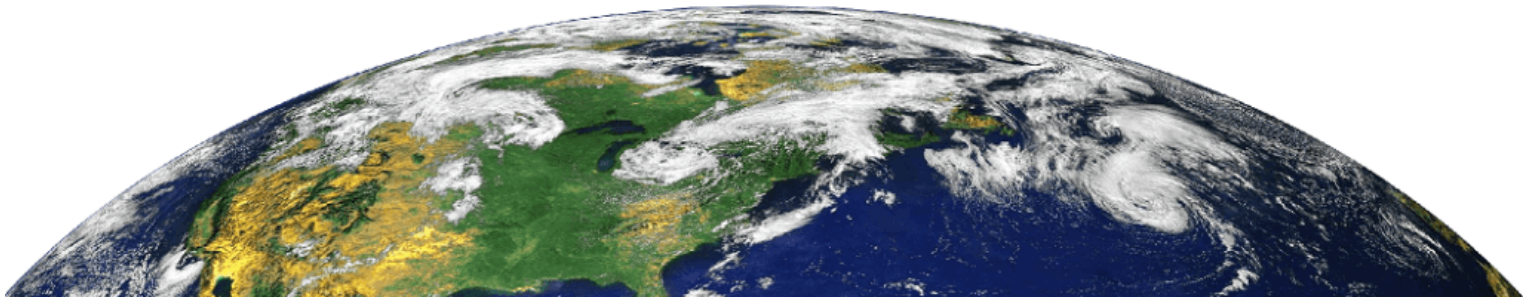
***Wissenschaftsetage im Bildungsforum* | Potsdam, Germany | October 7 – 9, 2024**

Welcome

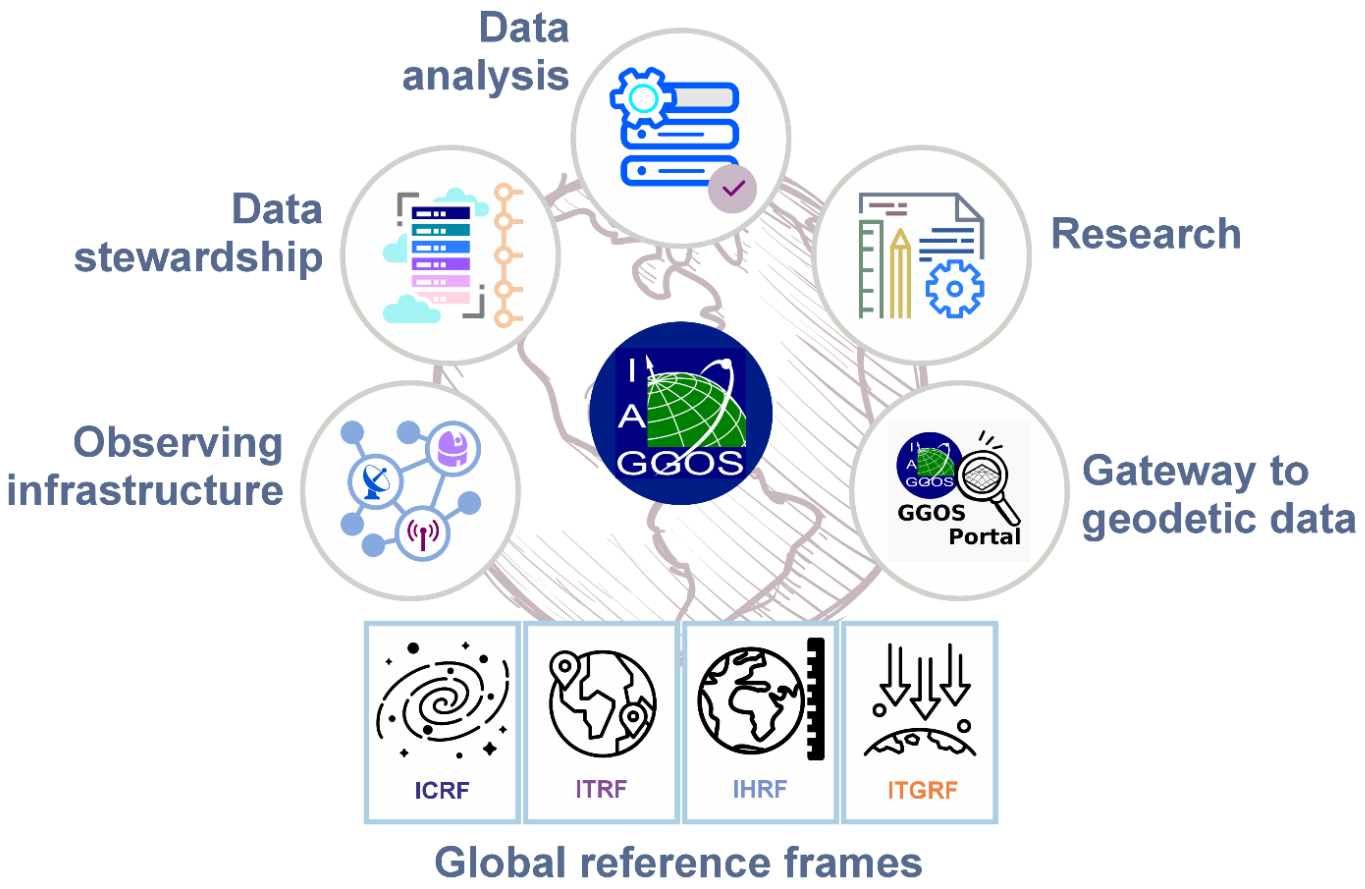
Laura Sánchez, President of GGOS
Technisches Universität München, Deutsches Geodätisches Forschungsinstitut (DGFI-TUM)

GGOS
Global Geodetic Observing System



- GGOS is the **Global Geodetic Observing System** of the **International Association of Geodesy**
- GGOS observes the **time-varying shape, rotation and gravity field of the Earth** with respect to **precise and long-term stable geodetic reference frames**.

Building blocks of GGOS



Commission 1
Reference Frames

Commission 2
Gravity Field

Commission 3
Earth Rotation and Geodynamics

Commission 4
Positioning and Applications

Inter-Commission Committees
on Theory (ICCT)
Geodesy for Climate Research (ICCC)
on Marine Geodesy (ICCM)

Project QuGe Novel Sensors and Quantum Technology for Geodesy

Geodetic products

Reference Frames


Height Reference Frame


Celestial Reference Frame


Gravity Reference Frame


Terrestrial Reference Frame

Earth Orientation


Earth Orientation Parameters

Geometry


Surface Deformation Models


Ocean Topography Models

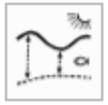

Sea Level Change


Digital Elevation Model


Ice Sheets & Glaciers – Variations


Station Positions & Variations


Tide Gauge Records


Sea Surface Heights

Gravity Field


Global Gravity Field – Models


Gravity Field – Temporal Variations


Terrestrial Gravity Data


Regional / Local Geoid Models


Ice Sheets & Glaciers – Variations


Height Systems

Positioning & Applications


Thermosphere


Ionosphere

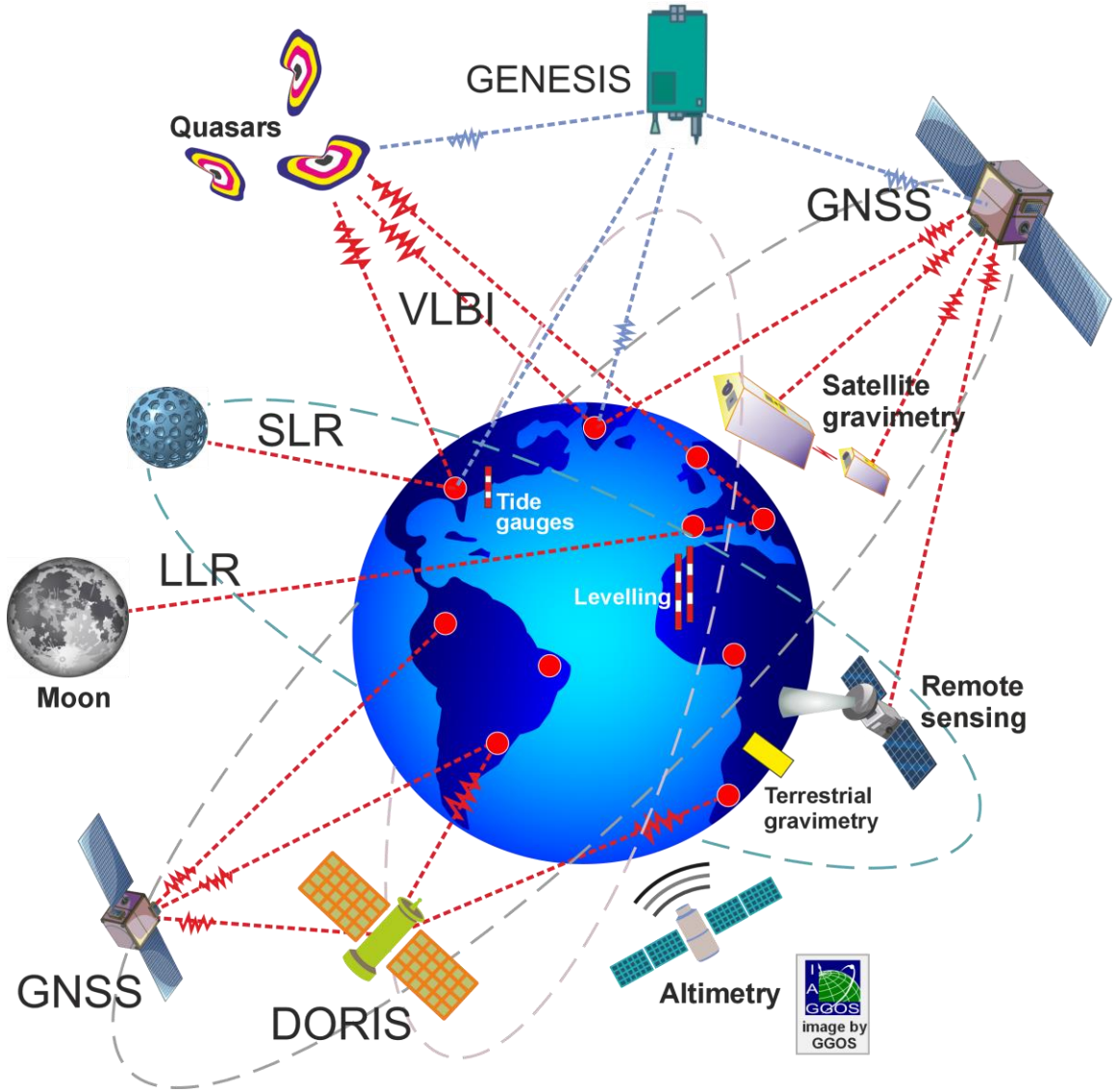

Lower Neutral Atmosphere


Atmospheric Products


GNSS Satellite Orbits and Clocks

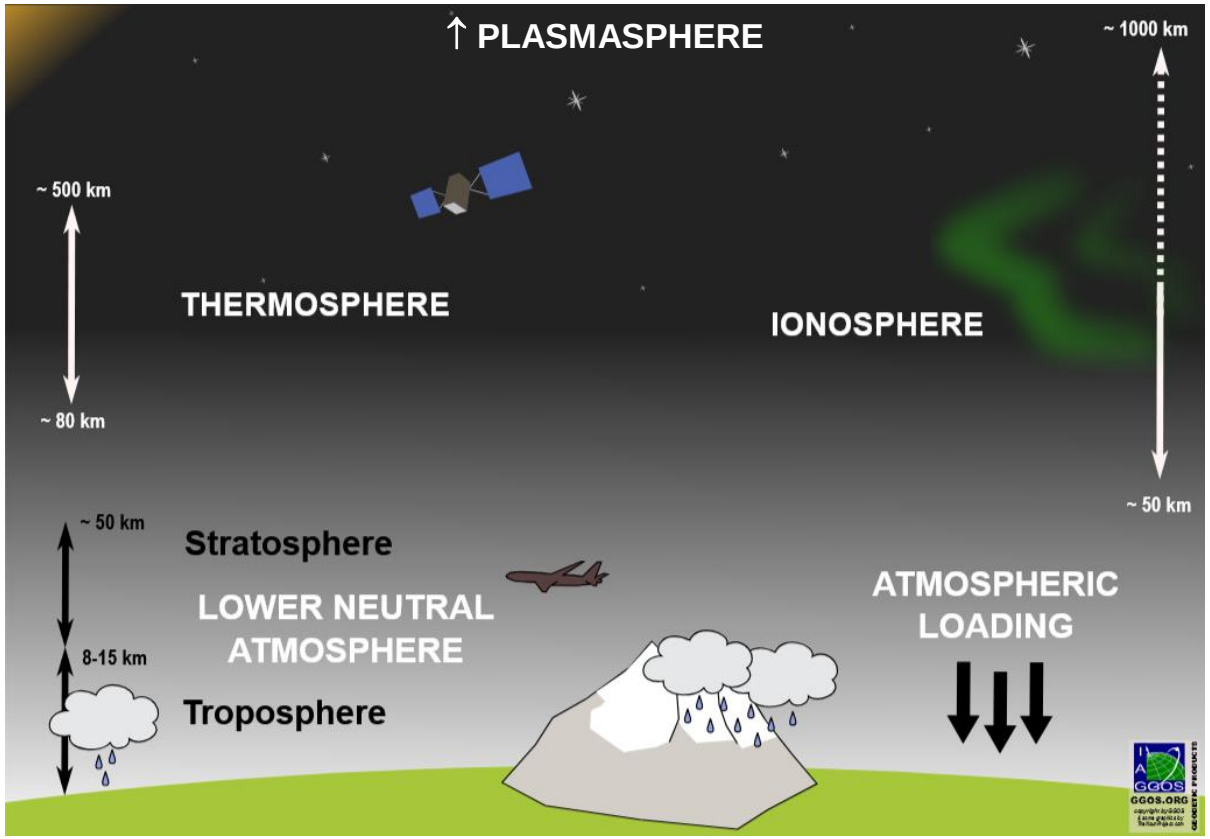

Satellite Orbits of Earth Observation Satellites (ESO)

Geodetic observation techniques of GGOS



- As most geodetic observations are affected by the atmosphere in various ways, **geodesists need to model/quantify/understand/correct** these effects and can **provide valuable information** on the **state and dynamics** of the atmosphere.
- This is of great interest for **monitoring the Earth system**.

Geodetic monitoring of the Atmosphere



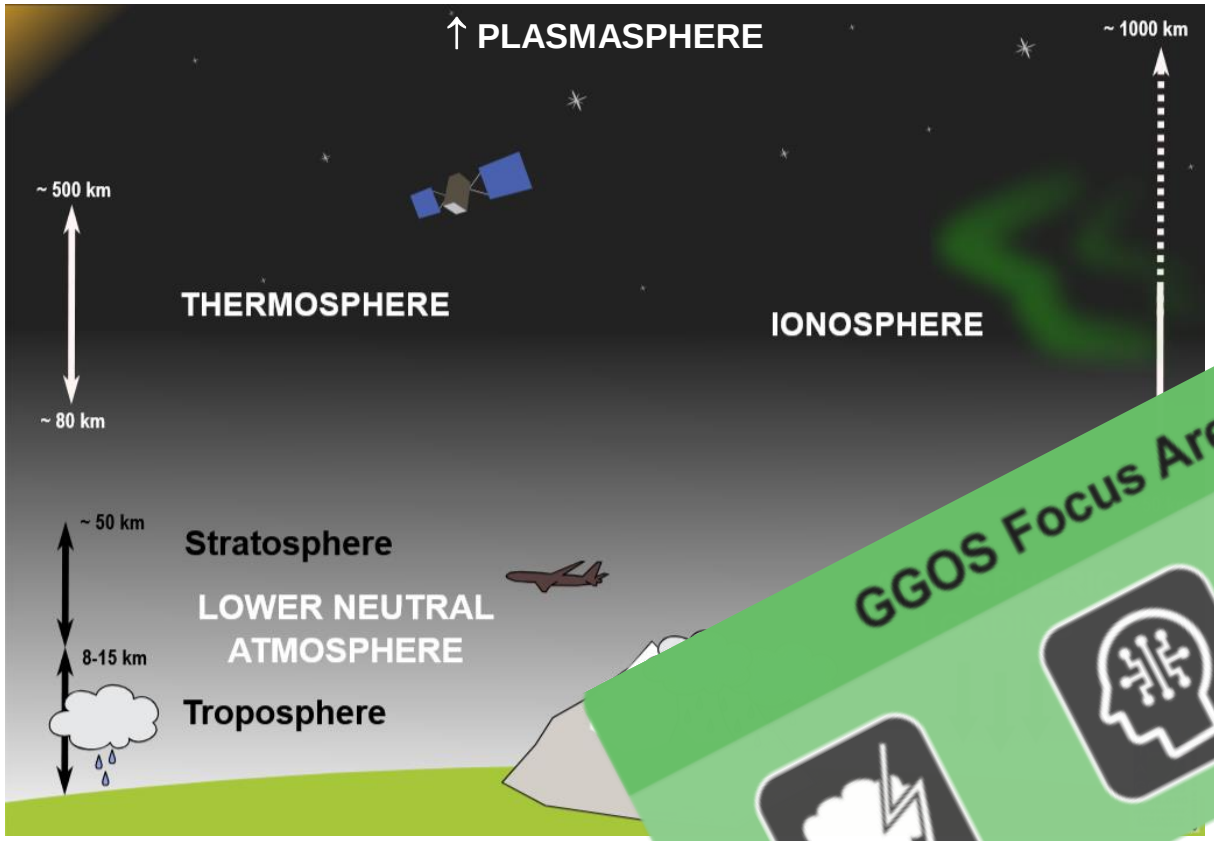
Is it possible to model the whole chain of cause and effect?

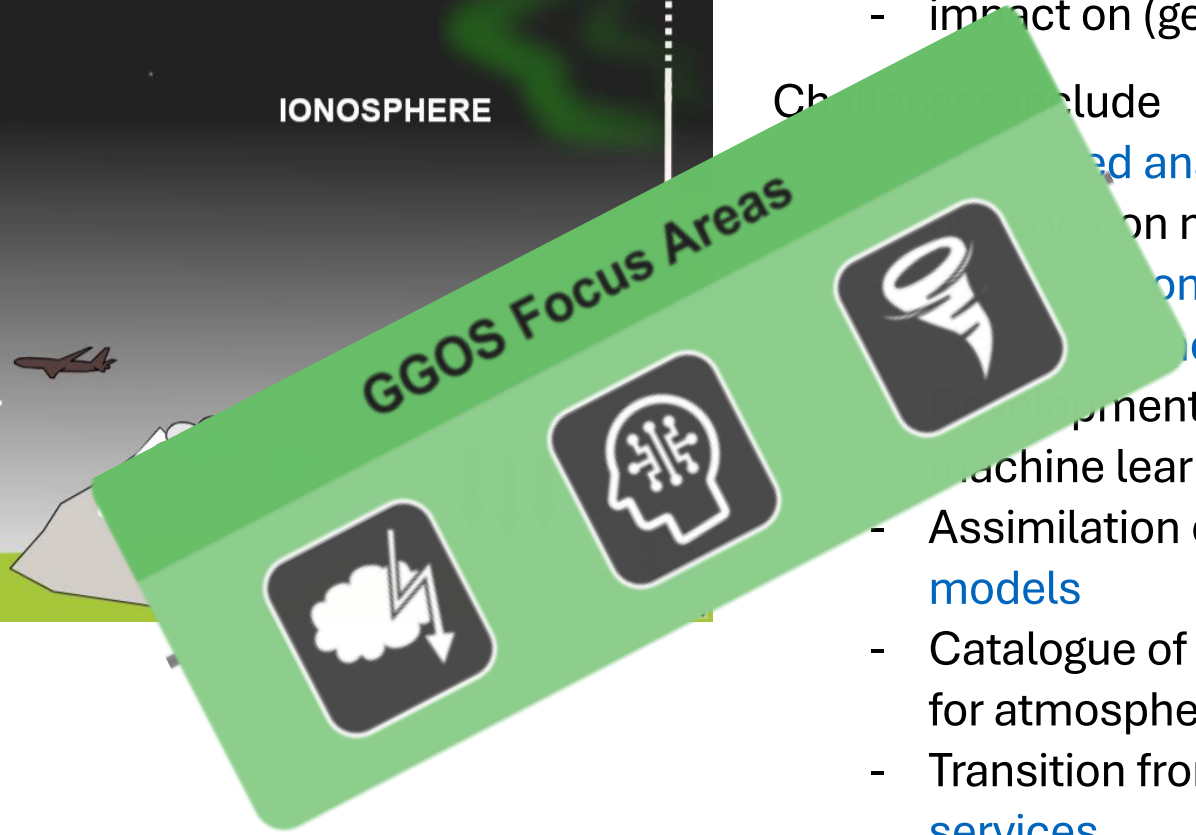
- processes and events on the Sun
- effects in the near-Earth space (commonly known as space weather)
- impact on (geodetic) applications and systems.

Challenges include

- Integrated analysis of all space geodetic observation methods
- Combination of Sun observations
- Real-time modelling
- Development of forecast approaches (considering machine learning algorithms)
- Assimilation of geodetic data into geophysical models
- Catalogue of geodetic products (essential variables) for atmospheric monitoring
- Transition from scientific research to operational services

Geodetic monitoring of the Atmosphere





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Ch[illegible]clude

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GGOS Topical Meeting on the Atmosphere

Objective: Bringing together **science excellence to integrate geodetic and geophysical technologies** for comprehensive monitoring of the atmosphere (troposphere, stratosphere, mesosphere, thermosphere, ionosphere/plasmasphere) and the magnetosphere.

- GGOS Focus Area "Geodetic Space Weather Research" and its study groups
  - "Understanding Ionospheric and Plasmaspheric Processes"
  - "Thermosphere Modelling and Applications"
  - "Space Weather Monitoring and Prediction"
  - "Atmospheric Coupling Studies"
- GGOS Focus Area "Artificial Intelligence for Geodesy" and its study group
  - "AI for GNSS Remote Sensing"
- IAG Commission 4 "Positioning and Applications",
  - Sub-Commission 4.3 "Atmospheric Remote Sensing"

GGOS Topical Meeting on the Atmosphere

- Study Group "High-resolution probing of the Troposphere and Ionosphere" of IAG Inter-Commission Committee on Theory
- Analysis Coordinator of the International Earth Rotation and Reference Systems Service (IERS)
- International Association of Geomagnetism and Aeronomy – IAGA
  - Interdivisional Commission on "Space Weather"
  - Division II "Aeronomic Phenomena"
  - Division V "Geomagnetic Observatories, Surveys and Analyses"

GGOS Topical Meeting on the Atmosphere

	Monday 7 October	Tuesday 8 October	Wednesday 10 October
8:30 – 10:30		Ionosphere modelling and applications	Water Vapor Monitoring
			Severe weather monitoring
10:30 – 11:00		Coffee + Posters	Coffee + Posters
11:00 – 12:40		Climate application of geodetic atmospheric parameters	Severe weather monitoring
	Registration & Opening		Atmospheric modelling based on artificial intelligence
12:40 – 14:00		Lunch break	Lunch break
14:00 – 15:00	Magnetosphere, Ionosphere, Plasmasphere and Thermosphere	Geohazards monitoring	Atmospheric modelling based on artificial intelligence
			Summing up
15:00 -16:30	Coffee + Posters	Coffee + Posters	
16:30 – 17:30	Magnetosphere, Ionosphere, Plasmasphere and Thermosphere	Geohazards monitoring	

Paper publication

Participants are invited to submit their papers to

Journal: Advances in Space Research (ASR),
https://cosparhq.cnes.fr/publications/advances-in-space-research-asr/
Special Issue: Ionospheric Imaging: Recent Advances and Future Directions
Deadline: 15 January 2025
Guest Editors: Marcio Muella, Fabricio Prol
More details at:
https://cosparhq.cnes.fr/assets/uploads/2024/04/Ionospheric-Imaging.pdf

Submissions will be subject to peer review before publication.

Special thanks to:




- **Michael Schmidt**, Lead of the GGOS FA “Geodetic Space Weather Research”, TUM, Germany and **Robert Heinkelmann**, Analysis Coordinator of the International Earth Rotation and Reference Systems Service (IERS), GFZ, Germany for **incubating the idea of this meeting and making it possible.**
- **Kirsten Elger** and **Nataliya Bobenko**, GFZ, Germany for the **fantastic logistical organisation**.
- **International Union of Geodesy and Geophysics** (IUGG), **International Association of Geodesy** (IAG) and **International Association of Geomagnetism and Aeronomy** (IAGA) for granting/supporting the IAGA/IAG project: **Characterisation of the ionised atmosphere in terms of essential variables.**
- **GFZ for hosting the meeting**
- The **Austrian Federal Office of Metrology and Surveying (BEV)** and the **Technical University of Munich, Deustches Geodätisches Forschungsinstitut (DGFI-TUM)** for hosting/supporting the GGOS Coordinating Office and the Presidency of GGOS, respectively.